5.Artificial empirical hypothesis

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Probabilidad Imposible: Artificial empirical hypothesis

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In education it is said there are two kinds of methods, didactic methods and heuristic methods. The reason for this distinction is because of the fact that in educational methodology is necessary to distinguish between teaching methods (didactics methods), and those methods used in any educational research, from practical issues to educational theory.

For that reason in Impossible Probability is said that there are two types of studies, didactic studies and heuristic studies. Didactic studies are those to acquire new knowledge for/by someone in particular, but new knowledge only for himself, not for the entire humanity. The typical learning at school, university, or by auto-didactic means by ourselves. Instead, heuristic studies are those made by scientific means in order to acquire new knowledge for humankind.

The first and essential difference between didactic and heuristic studies is: in didactic studies, we learn. In heuristic studies, we research. Learning and research use the same skills, but the difficulty, responsibility, and the plan we use, make a difference.

The psychological processes in both studies, didactic and heuristic, are the same. Whether we study for our bachelor´s degree or investigate in a research project in our postgraduate program, we need very high levels of cognitive skills such as analytical skills, inference, or deduction, among others.

In fact, while we are studying for our bachelor´s degree, we develop the scientific skills to complete later a master, where we are supposed to do a research project. When we are doing didactic or auto-didactic studies, we train essential skills that would later be necessary for scientific research.

In educational epistemology, didactic methods and heuristic methods are different. But in terms of developing Artificial Intelligence, didactic studies and heuristic studies, learning and research, need to develop the same skills.

Even when we resolve a very simple math problem at school, for instance, multiplication or division, the first step is to read the problem (collecting data), identify the problem and make a deduction about what algorithm we need (a hypothesis about the problem and how to resolve it), calculate, and check it.

In both studies, didactic and heuristic, the psychological processes are not really different: identification of basic information, definition of a problem, deductions, planning and putting it into practice, and finally, checking everything.
These similarities between learning and research are a key aspect of developing artificial research from artificial learning.

The big difference is the fact that, if one student makes a mistake in an exercise or an exam, there are no consequences except for himself. A mistake in an investigation about how much water there is on Mars would put a space mission to Mars at risk. Learning and research use similar skills, but the requirements in scientific investigation are more rigorous, and the decision could affect a lot of people or the future of humankind.

Until now, the psychological processes replicated in Specific Artificial Intelligence are those involved in learning, which has created a wide range of artificial learning systems. But, artificial learning is not to be sufficient for the creation of a Global Artificial Intelligence. In order to jump from the current Specific Artificial Intelligence to the future Global Artificial Intelligence, is necessary a jump from artificial learning to artificial research.

The current psychological processes that have been replicated in artificial learning are the same as in artificial research. What makes a difference is the level of difficulty, responsibility, and the necessity of a plan (in Artificial Intelligence, application), from the formation of a hypothesis, the validation of the hypothesis within a rational margin of error , and further decisions depending on the results.

These differences will make necessary the replication of the rest of the psychological process, involved in a scientific research process, that has not been replicated previously in artificial learning yet, for instance, the replication of abilities such as deduction that are going to be a key point in artificial research.

This jump from artificial learning to artificial research, should use firstly, as an experiment, Specific Artificial Intelligence models for artificial scientific research in all disciplines. When the results are successful, these systems should be applied in Global Artificial Intelligence.

In this process, one of the first steps is the replication of the hypothesis formation, by artificial deduction. In Impossible Probability, we have to distinguish between the empirical hypothesis and the analytical hypothesis. Empirical hypotheses are those used in empirical sciences, those sciences whose

object is the study of facts, but analytical hypotheses are those used in analytic sciences such as maths and logic.

The distinction between empirical or synthetic, or analytical, is within the tradition of rationalist philosophy. What is going to play an important role in artificial research, owing to its purpose, should not be only the replication of processes involved in empirical sciences.

One of the most important goals in artificial research would be the possibility that, in the medium or long term, a Global Artificial Intelligence could develop investigations at a very high level in mathematics and logic, exceeding the human mathematic logician models, the evolution to a non-human mathematical logical model.

The traditional distinction between pure mathematics and applied mathematics, so between artificial research in pure mathematics and artificial research in applied mathematics, by the time that artificial research would be widely developed, could open the door to new mathematical concepts, and developments in pure artificial mathematics beyond human understanding.

Right now, the construction of a Global Artificial Intelligence is only a simple project, and we do not have a prototype, but in coming years, the work is to be focused on the very first steps.

Among them, one would be focused on the development of the first models of artificial research In empirical sciences, through the first experimental models of Specific Artificial Intelligence doing the first investigations in a wide variety of empirical disciplines. Something was completely achieved when the first Specific Artificial Intelligence models would be able to do full investigations in all empirical sciences, making their own hypotheses and doing all the necessary tests to validate them within a rational margin of error, taking further decisions based on the results.

The first artificial research systems easiest to create would be in empirical sciences. Actually, there have been some experiments, although not sufficiently developed. Some of them, for instance, the current artificial intelligence used in the identification of exoplanets that could have life, or be good places for human colonies, or those models in the pharmaceutic industry.

These models of artificial research based on artificial learning have given good results, but not sufficiently for the creation of a Global Artificial Intelligence.

In the current models of Specific Artificial Intelligence applied to scientific research based on artificial learning, the only thing they do is, after the scientists have formulated the hypothesis and planned everything, the Specific Artificial Intelligence identifies in terms of probability those items according to the hypothesis formulated previously by the scientists. But the empirical hypothesis has not been made, in these examples, by these Specific Artificial Intelligences.

Instead, what it would be a really Specific Artificial Intelligence for artificial research, would be a Specific Artificial Intelligence able to do everything, from the formulation of the hypothesis up to the validation of the hypothesis, and taking further decisions.

The creation of the first models of Specific Artificial Intelligence in empirical sciences in artificial research would be necessary: firstly, the creation of applications for artificial research in all disciplines or empirical fields of academic investigation, that, secondly, could be enhanced through the replication of psychological processes, and finally, the development of auto-replication processes that could allow the Specific Artificial Intelligence to improve by itself all its own applications and replications. This first model of artificial research would be a model of artificial research by application.

Along with artificial research by application, a second model of Specific Artificial Intelligence in empirical sciences in artificial research could be that model specialized in the replication of artificial deduction for the formation of a hypothesis, which would be a model based on: artificial research by artificial deduction.

Due to, didactic studies and heuristic studies sharing the same skills, artificial learning and artificial research are going to share the same psychological replications, which means that, artificial learning as well as artificial research are going to be based on statistic theory, so Impossible Probability could play an important role in this development.

Firstly, I am going to draw the main general lines about possible artificial learning by application in medicine and astronomy, and later on, in artificial research by artificial deduction, saying that these two models, research by application or artificial deduction, are complementarily combinable.

The first model would be artificial research by application. In general speaking, the application itself would be the replication of a whole plan of investigation, including an automatic model of deduction, through the three general stages in Artificial Intelligence: application, replication, auto-replication. The first example

of this kind of artificial research by application I will develop would be an example in medicine.

Firstly the creation of a medical application: a team of scientists, or another Artificial Intelligence, elaborates a database with all kinds of medical problems described in bio-statistical or any other mathematical terms, and in case of diseases, a full description in bio-statistical terms of every symptom. Attached to each medical problem, the possible treatment, making notes about possible differences in the treatment according to the gravity of the problem, and differences that should be established as well by bio-statistical terms.

Secondly, replication: the deduction of an empirical hypothesis through the application, rationally criticizing the hypothesis, and taking further decisions. It could be made by Researching artificially the bio-statistics collected from a patient, a collection made by robotic means, and comparing later the patient bio-statistic with the database, so the medical problem in the database with more similarities, in terms of probability with the information collected from the patient, could be matched and formulated as a medical hypothesis of the origin of the problem. Here the deduction is made through the application. According to the hypothesis, the Artificial Intelligence tries to validate the hypothesis through medical tests, made by robotic means, and if the hypothesis is correct, within a rational margin of error, making further decisions about the possible treatment, attached to each medical problem in the database should be a full description of possible treatments according to the gravity of the problem.

Finally, auto-replication: if the Specific Artificial Intelligence finds a medical problem that is not registered in the database yet, the Specific Artificial Intelligence by itself could improve the database by including this medical problem in the database, defining the medical problem in bio-statistical or any other mathematical terms, and studying what treatment could be more suitable. For instance, if the new medical problem is a disease caused for a new virus or bacteria or the mutation of an older virus or bacteria, the identification of what chemicals and in what combination could fix the problem, making a list of possible combinations of different chemicals previously, so a list of possible medicines, and by discard to get the most suitable medicine in probabilistic terms. What it implies that the Specific Artificial Intelligence by itself could do medical experiments, something that it could be done through simulations based on empirical models: simulating an empirical model of the disease, and researching through the simulation what chemical combination, medicine, works better, so the Specific Artificial Intelligence could create automatically new medicines for new diseases.

In further stages of the development of Specific Artificial Intelligence in medical artificial research, the Artificial Intelligence itself would not only be able to improve the database by itself, but the Specific Artificial Intelligence would also

be able to make improvements by itself in all its own systems, even at the software level.

The full automation of medical sciences could be a great benefit for the entire humanity, owing an automatic or automatized medicine could reduce the rational margin of error in medicine, improving the efficiency and efficacy of medicines, and work without time off, making thousands of hypotheses simultaneously, and taking thousands of decisions simultaneously. Specific Artificial Intelligence in artificial research applied in medicine could improve the national health systems around the world, saving millions of lives.

Further developments in Specific Artificial Intelligence in medical artificial research could link this application to the robotic fabrication of medicines. Imagine a world where all kinds of medical decisions are made by Artificial Intelligence. This Artificial Intelligence could predict the number of medicines needed, according to predictions in the current trend in medical problems, and depending on the results, could directly order the fabrication of medicines, just on time, to robotic industries specifically designed for this purpose, and managed for Specific Artificial Intelligence specialized in industrial managing.

Artificial Intelligence could be one solution to the global health crisis in the coming years, among other reasons, a global health crisis because of global warming.

In the case of astronomical studies, firstly, the creation of an application: a database with all kinds of astronomical events, facts, or celestial bodies, describing every one of them in mathematical terms, prioritizing descriptions in statistical terms, astro-statistics. Secondly, the replication of the deduction process, rational criticism, and further decisions: through robotic means, making a collection of all possible data from the entire universe, matching every event, fact, or celestial body observed with the correct description of the event, fact and celestial body registered in the database, making a hypothesis about what kind of event, fact or celestial body has been observed according to the database, and later on testing every hypothesis. If the hypothesis is true within a rational margin of error, further decisions, and the creation of an empirical model of that event, fact, or celestial body observed. Finally, auto-replication: in case the Specific Artificial Intelligence could find any fact, event, or celestial body not registered in the database yet, then, according to the mathematical description of that event, fact, or celestial body, the inclusion of this phenomenon in the database, making all possible changes in previous simulations and empirical models. In the following stages, the possibility that this Specific Artificial Intelligence itself could make improvements by itself in all its systems, even in the software system.

The automation of astronomical research could be a great benefit for humankind. The study of the vast universe is going to need extra help. Only by human means it is going to be extremely difficult to understand what is happening beyond our understanding. The universe is so huge that the creation of artificial research in astronomical studies could accelerate and improve the creation of a strong theory of everything, which sooner or later is going to need the application of artificial research in mathematics and logic for the creation of non-human mathematical, logical models.

These two examples in medicine or astronomy about artificial research by application, following the three steps in Artificial Intelligence: application, replication, and auto-replication; are only two examples among the wide variety of models of Specific Artificial Intelligence in artificial research by application that could be made. Examples like these ones could be made in all disciplines and academic fields, models that would be only the previous ones to those that could be developed in the near future with much more sophistication, and they could come true complete automation of scientific research, a real automatic or automatized science, something that would boost the creation of a fully automatic or automatized economy.

Along with this one, artificial research by application, another method would be artificial research by artificial deduction. The difference with respect to the other one is: in artificial research by application, the deduction process has been replicated within the application, while in artificial research by deduction, much more than only an application, would be an entire Specific Artificial Intelligence specialised in deduction, that could be put into practice in different empirical sciences and academic files, through the replication of the psychological processes involved in the deduction process.

For instance, over a collection of observations taken from one phenomenon: the Specific Artificial Intelligence in artificial research by artificial deduction, should be able to make a full description of every observation in statistical or any other mathematical terms, identifying in statistical terms similarities and differences between the observations, and possible correlations between these observations and any other factor, before or after the observation, making possible deductions of cause and effect between the observations themselves, and between the observations and the factors before and after each observation, making correlations about the similarities among factors involved in all observations, and making a hypothesis about possible cause and effect regarding the factors and the observations.

While from the empiricist paradigm, given a collection of observations, it is possible only to make statements about only the observations themselves, from the rationalist paradigm is possible the elaboration of a full hypothesis about possible cause and effect, even though we have not had direct access to empirical information. For that reason, the rationalist paradigm is going to be

more suitable for artificial studies. Under the rationalist paradigm, we make hypothesis, even not having complete empirical evidence, only by deductions made from the collection of observations, hypothesis that later on is absolutely necessary to prove by the rational criticism, accepting a margin of rational error, which in turn, in Artificial Intelligence, this margin of error is going to decrease very fast, as soon as, it could develop a strong theory of everything, having access to everything, without restriction, making hypothesis of everything for further decisions.

The creation of the very first models of artificial research in empirical sciences would only be the beginning, which would be able to put the first bricks later for artificial research in maths and logic, and the real possibility of the creation of true artificial mathematical logical models.

In order to achieve this level of development, what is going to be really important is a huge development first in Specific Artificial Intelligence for empirical science as a good experiment that could give us good examples to later be replicated in analytic studies, maths and logic. As well as it is going to be absolutely necessary for a huge development in robotics that could allow Global Artificial Intelligence to operate in the real world by itself when all kinds of applications in Specific Artificial Intelligence will be successful, and ready to be integrated into a Global Artificial Intelligence.

Now, we are in the early stages of Artificial Intelligence. But when really great progress in Artificial Intelligence is made, and the Artificial Intelligence by itself can manage all kinds of scientific and economic decisions only by itself, a really Global Artificial Intelligence could make all its progress by itself, designing its own robotic tools according to the application that would need.

The benefits for humankind are clear: great progress in all sciences, among them for instance in medicine, being able to produce cheap medicines for all around the world, something that is likely to be really important when the global health crisis because of the global warming will be a bigger problem than it is nowadays, reducing the margins of error, and the margin of cost in the production of medicines, through very critical and rational decisions. An entire intelligence modelling the world through critical reason.

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